THE JOURNAL OF

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

(Including Transactions)

Volume 36 MAY 1914 Number 5

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C 55 The Society as a body is not responsible for the statements of facts or opinions advanced in papers or discussions.

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COMING MEETINGS OF THE SOCIETY

May 1, *New Haven, Conn.*, Mason Laboratory, Sheffield Scientific School. Quarterly meeting with sessions at 3 p.m. and 8 p.m. Subject, Afternoon Session, Aeronautics and the Internal-Combustion Motor; Papers: A Review of Aeronautical Progress, by John J. Long; Automobile and Aeroplane Motors, by David L. Gallup; Fuels for Internal-Combustion Engines, by D. B. Pangburn; Connecticut Aeroplane Company, by Everard Thompson. Subject, Evening Session, Aeronautics; Address by James Hartness; Papers: The Evolution and Status of Aeronautics, by Henry Woodhouse; Representative American Aeronautical Motors, by Howard Huntingdon. See p. V.

May 5, *San Francisco, Cal.* Subject: Stationary Diesel Engine Operation using California Fuel Oil.

May 12, *New York City,* Engineering Societies Building. Paper: Plans for the Main Drainage and Sewage Disposal for the City of New York, by H. deB. Parsons. Illustrated by lantern slides. Mr. Parsons, who is a member of the Metropolitan Sewerage Commission, will discuss the work of the commission and its plans for the protection of the various drainage divisions of the city.

May 13, *Boston, Mass.*, Engineers Club. Topic, Boiler Room Practice, discussed by Capt. Chas. H. Manning and other well-known engineers.

May 13, *Chicago, Ill.*, Hotel Sherman. Dinner meeting. Subject: Machine Shop Practice.

June 3, *St. Louis, Mo.*, Engineers Club. Paper: Oil Engines with Special Reference to Fulton-Tosi Oil Engines, by H. R. Setz. Illustrated by lantern slides.

Spring Meeting, June 16–19, *St. Paul-Minneapolis.* See pp. III and IX.

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THE SPRING MEETING

THE program for the Spring Meeting in St. Paul, Minneapolis, June 16-19, has been practically completed by the Committee on Meetings and the local committee, and offers many attractive features. Some views showing the picturesqueness of the two cities to be visited and a description of their many interests was published in the April issue, and in another page of this issue appears an account of the points of engineering importance, as well as some description of Duluth to which a side-trip will be made following the close of official meeting.

The social features which add so much to a meeting of this sort, especially at a time of year when the strain of the winter's work makes all desire relaxation and change, will be prominent, due to the good work of the local committee, and it is expected that the entire program will be thoroughly enjoyed. An outline of the events planned follows:

TENTATIVE PROGRAM

Tuesday, June 16, St. Paul

Opening of headquarters and registration.

5.00 p.m. Council meeting.

8.30 p.m. Reception.

9.30 p.m. Introductory remarks by James Hartness, President of the Society, followed by a message to the Engineering Fraternity, especially the mechanical engineering profession, by James J. Hill, former president of the Great Northern System. Welcome to Minnesota by Governor A. O. Eberhardt.

10.00 p.m. Dancing and refreshments.

Wednesday, June 17, St. Paul

10.00 a.m. Business meeting. Proposed amendments to the Constitution and announcement of ballot on amendments to C-9 and C-11. Report of Committee on Flanges.

PROFESSIONAL SESSION

Papers and a topical discussion on the subject of Powdered Fuel.

During the morning the ladies will be shown about the city and will be entertained at luncheon.

12.00 m. Conference luncheon for members of Council with representation of the local committees and sections.

Wednesday Afternoon

MISCELLANEOUS SESSION

INDUSTRIAL SERVICE WORK IN ENGINEERING SCHOOLS, J. W. Roe.

CLASSIFICATION AND HEATING VALUE OF AMERICAN COAL, Wm. Kent.

THE RAILROAD TRACK SCALE, W. W. Boyd.

GEAR TESTING MACHINE, Wilfred Lewis.

A NEW FLOW METERING APPLIANCE, A. M. Levin.

Wednesday Evening

8.15 p.m. Lecture on IRON ORE HANDLING, with moving pictures, by John Hearding, superintendent, Oliver Iron Mining Company, Duluth.

Thursday, June 18, Minneapolis

9.15 a.m. Leave for Minneapolis by trolley.

PROFESSIONAL SESSION, 10.00 A.M.

Meeting in the main engineering building, University of Minnesota, Minneapolis. Opened by an address by a member of the engineering faculty.

A series of papers on engineering developments in the vicinity of St. Paul and Minneapolis will be presented.

During the morning the ladies will be shown about Minneapolis in automobiles.

Thursday Afternoon

12.00 m. Luncheon at the University Building.

1.30 p.m. Members and guests leave by trolley for Excelsior, where the boat will be taken across Lake Minnetonka to the home of Mr. Gebhard Bohn. Mr. Bohn has a beautiful estate of about 20 acres. Supper will be served, followed by dancing.

10.00 p.m. Party will leave by train, due in Minneapolis at 10.30 and in St. Paul at 10.45.

Friday, June 19, St. Paul-Minneapolis

Technical excursions in St. Paul and Minneapolis.

2.00 p.m. Council meeting.

2.30 p.m. Trip to Duluth. On arrival at 6.30 p.m., the party will be received by local members and given an opportunity on Saturday to see the Duluth harbor.

PROFESSIONAL PAPERS

Those desiring advance copies should notify the Secretary

There are to be three professional sessions at the St. Paul-Minneapolis meeting, as listed in the program. The first session will follow immediately after the business meeting on Wednesday morning, June 17, at St. Paul, with papers and a topical discussion on the subject of Powdered Fuel. The papers will relate to the recent development in the use of powdered fuel in the cement industry, in the industrial furnaces and for the generation of steam.

On Wednesday afternoon will be a miscellaneous session with the following papers: Industrial Service Work in Engineering Schools, J. W. Roe; Classification and Heating Value of American Coal, Wm. Kent; The Railroad Track Scale, W. W. Boyd; Gear Testing Machine, Wilfred Lewis; and a New Flow Metering Appliance, A. M. Levin.

On Thursday morning at Minneapolis will be the final professional session with four papers on engineering developments in the vicinity of St. Paul and Minneapolis, treating of the following subjects: The High Dam between St. Paul and Minneapolis; Flour Milling and Flour Mills; Coal Handling; and the Gasolene Electric Car as operated on the Minneapolis, St. Paul, Rochester and Dubuque Electric Traction Company Line (so-called Dan Patch).

Abstracts of all the papers assigned for the Spring Meeting will be published in The Journal for June. *Complete copies of the papers will be mailed to members upon application to the Secretary.* It is expected that these will be ready in pamphlet form about June 1.

TRANSPORTATION

It has been arranged to have a special train convey the members from Chicago to St. Paul, over the C. B. & Q. R. R., leaving Chicago Monday evening, June 15, at 10.45, and arriving in St. Paul at 3.30 on Tuesday afternoon. This train will have a very high grade of equipment, combining safety and comfort with punctuality. There will be standard drawing room and compartment sleeping cars and a large steel dining car, lighted by concealed indirect lighting and having many new and unusual conveniences, will be attached. The train will also include a lounge-observation car of luxurious type, with smoking room and buffet annex, large lounging parlor, writing alcove and library. At the rear of the car is a sun parlor having broad plate glass windows which may be removed in a short space of time, creating an open car. The train will be electric lighted from the head end by a 64-volt, 25-kw. Curtis turbo-generator, which will be in charge of an expert who will demonstrate its operation. A dynamometer car in full operation will be attached to the train, showing how the various tests records on railroads are taken automatically.

Three stops en route have been planned. The first of these will be made at De Soto, Wis., on Tuesday morning, from 6.30 to 7.30, for the observation of the rebuilding and double tracking now being done on this line. Much of the work is being accomplished by a dredging process never before used, and one of these dredges in operation, working from the river to the railroad, will be seen at this point.

At Grand Crossing, Wis., another stop will be made from 8.55 to 9.40 a.m. Here a large non-articulated locomotive will be on exhibition, said to hold the record for economical operation. Part of its equipment consists of an automatic stoker.

At a quarter past eleven the train will make a stop for three hours at Pepin, Wis., to enable the party to enjoy the beauties of Lake Pepin, which is a natural broadening of the Mississippi River, 22 miles long. Among the events planned are motor boat rides on the lake and short automobile tours into the surrounding country. A large government pier located on the lake will also be of interest.

For the assistance of members who will attend the Spring Meeting from the East, the following schedule of trains which will insure connections with this special train at Chicago is offered:

N. Y. C. & H. R. R. R. CO.

Lv. New York..	6.45 p.m.	Arr. Chicago..	5.00 p.m.	Fare, $25
Lv. New York..	2.00 p.m.	Arr. Chicago..	5.00 p.m.	Fare, $20
Lv. New York..	5.00 p.m.	Arr. Chicago..	2.00 p.m.	Fare, $26

P. R. R. CO.

Lv. New York..	2.06 p.m.	Arr. Chicago..	5.00 p.m.	Fare, $20
Lv. New York..	5.04 p.m.	Arr. Chicago..	2.00 p.m.	Fare, $26
Lv. New York..	6.04 p.m.	Arr. Chicago..	8.54 p.m.	Fare, $20

For a party of ten or more a reduction of $1.85 on the fare quoted will be made. The cost of sleeping reservations on any of these trains is at the rate of $5 for the lower and $4 for the upper berths.

The Pennsylvania Railroad lands its passengers in Chicago at the Union Station, from which the trains on the C. B. & Q. R. R. start.

The fare from Chicago to St. Paul will be $8.15, and $2 for sleeping berths.

LANTERN SLIDES

The lantern slides descriptive of the Society's trip to Germany last summer, which were used in connection with Mr. Worcester R. Warner's lecture at the Annual Meeting dinner, are available for use by the membership upon application to the Society's headquarters.

There are also about fifty slides showing views of the Engineering Societies Building which may be borrowed by local sections or student branches which desire to present them before a meeting.

QUARTERLY MEETING AT NEW HAVEN

Aeronautics is to be the main topic of the quarterly meeting at New Haven on May 1, which will as usual be held in the Mason Laboratory of Mechanical Engineering of Sheffield Scientific School. At the afternoon session, commencing at 3 o'clock, when Aeronautics and the Internal Combustion Motor will be considered, John J. Long of Brown University will give an illustrated Review of Aeronautical Progress, followed by three papers, one by Prof. D. L. Gallup of Worcester Polytechnic Institute, another on Fuels for Internal Combustion Engines, by D. B. Pangburn of Sheffield Scientific School, and a third by Everard Thompson of New Haven, on the Connecticut Aeroplane Company. A demonstration of aeroplane motors in the Mason laboratory, given by E. F. Gallaudet of Norwich, Conn., will conclude the session. Dinner will be served at 6 o'clock in the Yale Dining Club, and the evening session will commence at 7.30. President Hartness will open the meeting with an address, and two papers will be presented, The Evolution and Status of Aeronautics, by Henry Woodhouse, Editor of Flying, and Representative American Aeronautical Motors, by Howard Huntingdon of New York.

COUNCIL NOTES

At a special meeting of the Council on April 10, formal approval was voted in the interest of the public of the appointment of engineers, qualified by training and experience, on public service commissions and as heads of engineering departments in national, state and city governments, in accordance with the report of the Public Relations Committee and Alfred Noble. The committee in its report stated that experience had shown engineering training and special knowledge of and experience in organization to be an essential equipment, in addition to business capacity and tact, for the efficient discharge of such duties.

The following Committee on Meetings in Philadelphia was approved: H. E. Ehlers, Chairman, W. R. Jones, Secretary, George R. Henderson, R. H. Fernald, Hugo Bilgram and D. R. Yarnall.

Alex. C. Humphreys and E. D. Meier were chosen as representatives of the Society on the Joint Reception Committee to arrange for the reception of engineers in connection with the International Engineering Congress of 1915.

It was voted to appoint a committee to consider and report its recommendations for the standardization of pipe threads for gas and electric fixtures and conduit fittings, supplementing the important work of the International Committee on Pipe Threads.

Notice was given of the purpose to amend By-Law 2 regarding requirements for references for applicants for membership. When an applicant is residing where there are not five members, then members of other professional societies of similar standing to our own may qualify as references.

Announcement was made through a letter from the Secretary of the Board of Trustees of the gift to the library by John W. Lieb, Jr., of a series of rare volumes covering the work of Leonardo da Vinci. The Secretary was directed to express the sincere appreciation of the Council.

The formation of student branches at the Universities of Michigan and Colorado was approved.

CALVIN W. RICE, *Secretary*

AN INCREASING MEMBERSHIP

The names of applicants for membership published in The Journal from month to month indicate the regular and substantial growth which the Society is experiencing. From January 1 to March 31 the total number of these applications was 524, of which 323 have been received during March alone. In looking through the list of these applications as published in The Journal it will be noted that comparatively few are for promotion, and that in the majority of cases the applicants are men who are holding responsible positions in the engineering field, whose admission will serve to maintain the Society's high standard.

The Committee on Increase of Membership recently made an interesting analysis of the applications received from different sections of the country since December 1, as follows:

Chicago	33	St. Paul	7
Philadelphia	26	Atlanta	7
Boston	24	Seattle	7
St. Louis	22	Worcester	7
Detroit	15	Milwaukee	6
New Haven	12	Rochester	6
Cleveland	12	Troy	4
Buffalo	9	Providence	4
San Francisco	8	Los Angeles	1
Cincinnati	7		

The following analysis of the alumni of technical colleges from whom applications have been received since December 31 is also of interest:

Massachusetts Institute of Technology	35
Stevens Institute of Technology	35
Lehigh University	34
Cornell University	33
University of Michigan	19
Worcester Polytechnic Institute	17
University of Illinois	16
Pratt Institute	13
Yale University	13
Purdue University	12
Swarthmore College	11
Ohio State University	9
University of Missouri	8
Columbia University	8
Pennsylvania State College	7
Harvard University	6
Brooklyn Polytechnic Institute	5
University of Pennsylvania	5

REVIEW SECTION OF THE JOURNAL

The Foreign Review was started in The Journal three years ago to place at the disposal of the membership some of the least accessible of the engineering data contained in the periodicals which are regularly received in the library of the Engineering Societies. This Review has met with marked success. From the many letters received it is known that a large number of firms and individuals are regularly following its pages and it therefore may be of interest to the membership to call attention to certain features of the Review and to indicate the field that it is attempting to cover.

With the advent of the new Journal, the Review was extended to include the proceedings of engineering societies as well as articles in foreign periodicals. There are regularly received in the library more than 700 publications, of which 250 are in foreign languages and 150 are the proceedings of engineering societies. The 250 non-English publications cover writings in eleven different languages.

With such a diversity of material, it is evident that the Review section of The Journal must cover a very broad field, and it will be found that even in a single issue there are a great variety of abstracts, such as, for example, the results of an expensive and painstaking investigation in some government laboratory of Holland or Russia, an Austrian university or a German factory experimental department; a description of a power plant device from a Scandinavian periodical; a mathematical discussion of a thermodynamic problem from the Bohemian language; a paper presented before a technical society in South Africa or Australia; and a discussion before some American or British organization of international repute.

In the preparation of this matter, the effort is made to incorporate enough of the data in the original publication so that the purpose of the reader will be served without his having to refer to the article itself. Sometimes, however, the extent or nature of the article makes this impossible, in which case enough is said to call attention to its contents and to indicate whether it is worth anybody's while to look into it further. If more information is desired the library is ready to prepare a more extended translation for a nominal sum.

In mathematical articles as a rule only the results are given without the derivation of the formulae. Drawings and tables are often reproduced and units of measurement are given with their American equivalents. Wherever possible, reference is made to publications in the English language containing fuller information on the subjects treated.

It is not alone to the member distant from New York that the Review is proving valuable. It is probable that no reader, even though a frequent visitor to the library, could acquire the information through his own efforts which the Review is regularly supplying. It is not simply the ability to translate articles from foreign languages into English; the most difficult work in connection with the Review is to make the selection of material and then to condense perhaps a dozen pages into a single page of intelligible matter with the engineering idioms correctly given. This latter is of particular importance. While there is no lack of technical dictionaries, there is also no end to the idioms which they do not contain, and the Editor of the Engineering Survey is not infrequently consulted by readers in the Engineering Societies Library who, while they may be proficient in certain foreign languages, are unable to interpret this or that technical term " which is not in the dictionaries."

The Review section of The Journal will be extended from time to time as the resources of the Society permit, so that the library will in this way become of increasing usefulness to the membership at large, as well as to those who are able to consult the books on its shelves. By this means and by researches, translations, the answering of technical inquiries and by supplying references upon engineering subjects, in all of which directions much work is now done, the library will become more and more a factor for service in the profession.

BRINGING THE MEMBERS INTO TOUCH WITH THE SOCIETY

The national character of the Society is emphasized by the meetings which are now held with regularity in many cities throughout the country, by the widespread membership of the various committees, several of which have been very active during the past year in promoting the interest of engineering, and by the large percentage of engineering colleges having student branches. It is the aim of the Society to bring together this scattered membership in closer relations by various means.

This spirit of unity has been greatly increased by personal calls made from time to time by officers or members especially delegated to bring words of greeting from the Society to various gatherings and to discuss with the membership the aims of the Society. Since his election to the presidency, Mr. James Hartness has given up a very considerable amount of time to getting into personal touch with the members in different cities as well as with the student membership. To enumerate a few of the many engagements of this sort which he has filled during the past few months, he attended the dinner and meeting of the Buffalo engineers on February 26; on March 4 he made an address at the Joint Engineers Dinner in Boston; and on March 14 and 31 respectively, he attended the Sibley College banquet in Ithaca and the Engineering College Alumni dinner of the University of Vermont. He addressed the students of the latter college on April

17 and on April 29 was the guest of the Providence Association of Mechanical Engineers at their annual dinner. During May he will speak before the Yale Student Branch on May 1, at the meeting of the Chicago Section on May 13, and before the Engineering Society of Pennsylvania on May 16.

The Society has been glad to welcome at its headquarters during the past month several large groups of students visiting New York on tours of inspection. These groups included more than a hundred men from Sheffield Scientific School, over fifty from both the Case School of Applied Science and Pennsylvania State College, and a smaller group from Rensselaer Polytechnic Institute. A small brochure, describing the Engineering Societies Building and its features of interest, with some details of the Society's work, was distributed to all the students who visited the building. It is by such means as these that the Society and its student branches are being brought into touch with one another to their mutual benefit.

THE INDUSTRIAL BUILDING COMMITTEE

Progress in the work of the sub-committee on Industrial Building was reported at a conference of five members of the committee at Boston, Mass., on April 17, where they were entertained by Charles T. Main at the Boston Engineers Club. In line with the program mapped out at the December meeting of the committee, subjects were assigned to the members as follows: Foundations, Charles T. Main; Types of Structures, William Dalton; Fire Protection, Harry A. Burnham; Factory Windows, John De Wolf; Selection of Site, Chas. Day.

While assigning these subjects to individual members, it is the purpose of the committee to handle all papers under its jurisdiction by such coöperative methods amongst its members that the subjects may be treated in a most comprehensive and exhaustive manner. It was decided at this meeting that specific features should be dealt with in the papers rather than general features, as far as possible. The paper on Foundations will be taken up first and the others in the order assigned.

APPLICATIONS FOR MEMBERSHIP

Members are requested to scrutinize with the utmost care the following list of candidates who have filed applications for membership in the Society. These are sub-divided according to the grades for which their age would qualify them and not with regard to professional qualifications, i.e., the age of those under the first heading would place them under either Member, Associate or Associate-Member, those in the next class under Associate-Member or Junior, while those in the third class are under twenty-five years of age and therefore qualified for Junior grade only. The Membership Committee, and in turn the Council, urge the members to assume their share of the responsibility of receiving these candidates into the membership by advising the Secretary promptly of any one whose eligibility for membership is in any way questioned. Members will be furnished with complete records of any candidate thus questioned. All correspondence in regard to such matters is strictly confidential and is solely for the good of the Society, which it is the duty of every member to promote. These candidates will be balloted upon by the Council unless objection is received before June 10, 1914.

FOR CONSIDERATION AS MEMBER, ASSOCIATE OR ASSOCIATE-MEMBER

ABEL, JOHN, Treas. & Factory Mgr., Mersereau Metal Bed Co., Jersey City, N. J.

ADAMS, DAN, Head of Steam Engrg. Dept., Lockwood, Greene & Co., Boston, Mass.

ANDERSON, JOHN N., Engr., Otis Elevator Co., New York

BAMFORD, CHARLES J., Ch. Engr., Agasote Millboard Co., Trenton, N. J.

BASCOM, ROLLIN S., Supt., A. J. Smart Mfg. Co., Greenfield, Mass.

BOURNE, PHILLIP P., Ch. Engr., Epping Carpenter Pump Co., Pittsburgh, Pa.

BURHORN, EDWIN, Pres., Edwin Burhorn Co., New York

CROZIER, HERBERT W., San Francisco Office Mgr., Sanderson & Porter, San Francisco, Cal.

CUTTER, LAWRENCE E., Asst. Prof. of Mech. Engrg., Stanford University, Cal.

DIAMOND, GEORGE A., Mgr., Scheid & Co., Nome, Alaska

EASTMAN, SAMUEL G., Chicago Sales Mgr., Pratt & Whitney Co., Chicago, Ill.

FELIX, SAMUEL P., Eastern Sales Mgr., Dravo-Doyle Co., Pittsburgh, Pa.

FLOWERS, DEAN W., Supt., Gas Wks., St. Paul Gas Light Co., St. Paul, Minn.

FRAZAR, EVERETT W., Managing Director, Sale & Frazar, Ltd., Tokyo, Japan

FREER, WM., G., Pwr. Engr., Schenectady Wks., American Locomotive Co., Schenectady, N. Y.

GASTON, NEWTON D., Efficiency Engineer, Adams & Westlake Co., Chicago, Ill.

GIFFORD, ROY W., Treas. & Mgr., Deyo Machinery Engine Co., Binghamton, N. Y.

HALL, QUINCY A., Secy. & Engr. of Tests, Morgan T. Jones Co., Chicago, Ill.

HARGRAVE, HUGH H., Designer with W. J. Rainey, Uniontown, Pa.

HERR, DONALD D., Genl. Supt. of Constr. and Sales Engineer with A. G. McKee, Cleveland, Ohio

IWANAMI, TAKAO, Draftsman, Interborough Rapid Transit Co., and N. Y. Railways Co., New York

JESSOP, FRANCIS W., Wks. Mgr., The Electric Controller & Mfg. Co., Cleveland, Ohio

JUTHE, KRISTIAN A., New England Representative, Firth-Sterling Steel Co., Pittsburgh, Pa.

KAMMERHOFF, H. H. M., Elec. Engr., Edison Storage Battery Co., West Orange, N. J.

KELLY, ODHER G., District Turbine Inspector, General Electric Co., Chicago, Ill.

KIRSCH, JAMES L., Palmerton, Pa.

LANGE, PAUL H., Engr., Niagara Machine & Tool Works, Buffalo, N. Y.

LITTLE, ARTHUR L., Mech. Supt., Eastern Mfg. Co., South Brewer, Me.

MASON, EARL P., Secy. & Supt., Newport Engrg. Works, Newport, R. I.

MAYO, EDWARD D., Ch. Engr., The Barnett & Record Co., Minneapolis, Minn.

MORRISON, W. B., Asst. Genl. Mgr., McIntosh & Seymour Corp., Auburn, N. Y.

NYE, HORATIO V., Asst. Supt., The Northwestern Consolidated Milling Co., Minneapolis, Minn.

OLSON, MARTIN L., Instr. in Mch. Shop Practice and Drawing, Public Schools, Boston, Mass.

PATTERSON, EUGENE C., Secy. & Genl. Mgr., Chattanooga Boiler & Tank Co., Chattanooga, Tenn.

PEDERSEN, NIELS, Genl. Supt., Sloan & Chace Mfg. Co., Newark, N. J.

ROSENZWEIG, SIEGFRIED, Consulting Engineer, York Mfg. Co., York, Pa.

RUTH, CONANT W., Mech. Engr., Stone & Webster Engrg. Corp., Boston, Mass.

SARGENT, WM. F., Representative and Estimator, The Bigelow Co., New Haven, Conn.

SINGLETON, FRED, Mech. Representative, Locomotive Superheater Co., Dunkirk, N. Y.

SMITH, CHARLES H., Engr. & Special Inspector, Associated Factory Mutual Fire Insurance Companies, Boston, Mass.

SMITH, EDWIN D., Vice-Pres. & Genl. Mgr., The Arrow Engrg. Co., and Vice-Pres., Amer. Lt. & Pwr. Co., St. Louis, Mo.

STEBBINS, CHARLES B., Ch. Engr., Sheffield Car Co., Three Rivers, Mich.

TENNEY, LEWIS C., Building Engr., Cadillac Motor Car Co., Detroit, Mich.

WADDELL, ROBERT, Ch. Draftsman, Washington Iron Works, Seattle, Wash.

WAGNER, OTTO H., Supt. of Construction, Decarie Incinerator Co., Minneapolis, Minn.

WAGONER, PHILIP D., Pres., General Vehicle Co., Inc., Long Island City, N. Y.

YODER, THOMAS M., Representative, Erie City Iron Works, New York

FOR CONSIDERATION AS ASSOCIATE-MEMBER OR JUNIOR

BLACK, EDGAR N., 3RD, Asst. Engr., with Wm. H. Timm, Philadelphia, Pa.

BROWN, AUBREY I., Instr., Mech. Engrg. Ohio State University, Columbus, Ohio

CONSOLIVER, EARL L., Field Engr., Hoeschen Mfg. Co., Omaha, Nebr.

FLIPPEN, JOHN P., Testing Engineer, C. H. Wheeler Mfg. Co., North Philadelphia, Pa.

FORD, WINTHROP D., Mech. Engr. & Representative, International Steam Pump Co., Boston, Mass.

FRIED, JEROME A., Research and Consulting Work, 324 Wait Ave., Ithaca, N. Y.

GALLIVAN, JOHN D., Asst. to Genl. Foreman, Hydraulic Dept., Isthmian Canal Commission, Gold Hill, C. Z.

HOSSACK, ARCHIBALD B., Eastern Solicitor, The American Appraisal Co., New York.

KIESELBACH, HENRY A., Mech. Engr., Baker, Smith & Co., New York.

MEIXNER, BERNARD A., Engrg. Representative, R. B. Whitacre & Co., St. Paul, Minn.

SCHOPFER, FRANK H., Designer, E. N. & R. E. Spaulding, Engrg. Contractors, Suffield, Conn.

SHAW, JOSEPH H., Mech. Engr., American Vulcanized Fibre Co., Wilmington, Del.

SMITH, EUGENE, Cincinnati District Mgr., Detroit Stoker Co., Detroit, Mich.

STEE, HORATIO V., Asst. Supt., The Northwestern Consolidated Milling Co., Minneapolis, Minn.

STRONG, ARTHUR P., Asst. Engr. of Ash Handling, Green Engrg. Co., Chicago, Ill.

FOR CONSIDERATION AS JUNIOR

GENTRY, THOMAS C., Special Apprentice, Erie R.R., Huntington, Ind.

HAASIS, PAUL W., Special Apprentice, Erie R.R., Huntington, Ind.

HEHEMANN, FRED H., Mech. Draftsman, The Lunkenheimer Co., Cincinnati, Ohio

JONES, LEON B., Asst. Engr., Gas Dept., Pacific Gas & Elec. Co., San Francisco, Cal.

LAWRENCE, MEREDITH F., Representative, The Westinghouse Machine Co., New York

TAYLOR, FORREST C., Engr. & Draftsman, Mechanical Handlor Co., Chicago, Ill.

WALKER, KARL G., Asst. Foreman, Stirling Drum Shop, Babcock & Wilcox Co., Barberton, Ohio

TRANSFER FROM ASSOCIATE

CHAPMAN, DAVID A., Mech. Supt., Wm. Filene Sons Co., Boston, Mass.

FLANDERS, RALPH E., Mgr., Jones & Lamson Mch. Co., Springfield, Vt.

HOGAN, PATRICK H., N. E. Mgr., Dearborn Chemical Co., Boston, Mass.

MITCHELL, GUY K., Prop., Standard Elec. & Elev. Co., Baltimore, Md.

PROMOTION FROM JUNIOR

EARLE, SAMUEL B., Director of Engrg. Dept., and Prof. of Mech. Engrg., Clemson Agri. College, Clemson College, S. C.

HEATON, HERMAN C., Mech. Engr., Sargent & Lundy, Chicago, Ill.

LOVEJOY, FRANK W., Genl. Mgr., Manufacturing Depts., Eastman Kodak Co., Rochester, N. Y.

MOREHEAD, WM. C., First Vice-Pres., Natl. Lt. & Pwr. Co., St. Louis, Mo.

NEELY, FREDERICK L., Mech. Engr., Central Ga. Pwr. Co., Central Ga. Transmission Co., Macon Rwy. & Lt. Co., Ga. Public Service Corp., and Asst. to Mgr., Macon Gas Co., Macon, Ga.

SEWARD, HERBERT L., Instr. in Mech. Engrg., and Supervisor, Power Plants, Sheffield Scientific School, New Haven, Conn.

WILCOX, PERLEY S., Asst. Mgr., Kodak Park Works, Eastman Kodak Co., Rochester, N. Y.

SUMMARY

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ENGINEERING FEATURES OF THE SPRING MEETING

THERE are many points of interest to be visited at the time of the Spring Meeting and the local committee have provided opportunities for the inspection of the great engineering works and industrial developments which have made this section of the Northwest supreme in the production of ore and grain and of the utmost importance in a varied line of industries.

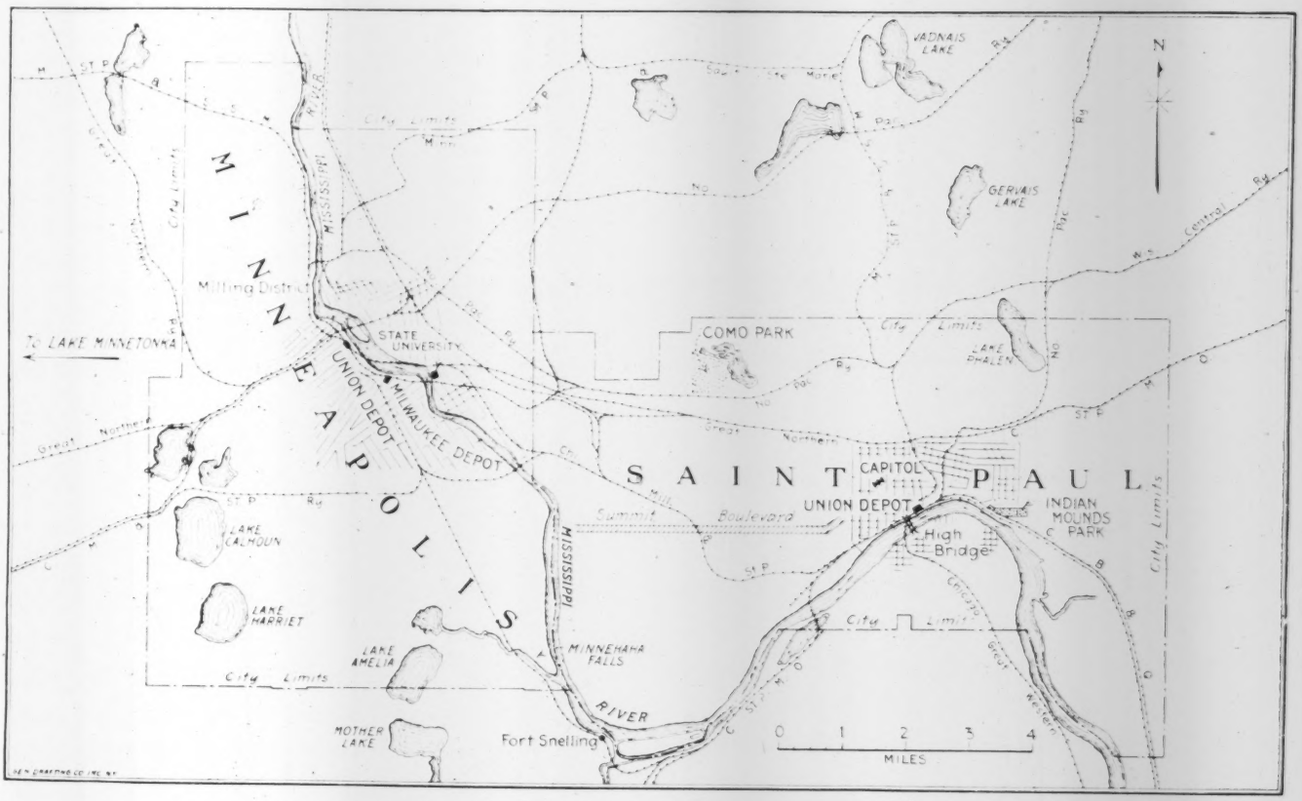
The characteristic feature of the industrial section of Minneapolis is the milling district, the largest milling center of the world, located within a space of eight square blocks. The reason for the concentration of this industry at this point is the immense water power at St. Anthony's Falls on the Mississippi River, which has been supplemented by other hydraulic developments in the vicinity, the latest of which is the High Dam on the Mississippi between St. Paul and Minneapolis, at present almost completed. At the time of the Spring Meeting the 100,000 kw. units of the power station will be in process of installation.

In connection with the mills in the same district are immense grain elevators handling thousands of bushels of grain daily. Representative of this is the plant of the Electric Steel Elevator Company, which has a record of handling 86 cars of grain in 13 hours.

ST. PAUL EXCURSIONS

In regard to the technical excursions, plans have been made for visiting the following points of interest in St. Paul:

The High Dam under construction between St. Paul and Minneapolis, already mentioned. One of the papers of the meeting will be devoted to the subject of this plant.



MAP SHOWING THE RELATIVE LOCATION OF THE TWIN CITIES

The new state prison at Stillwater, the most modern construction of its type in the country, and a model for penitentiaries the world over. In connection with the prison there are a twine factory and warehouse, printing room, library, hospital building, and there are now in process of construction a farm machinery factory and a foundry building containing a machine shop

Panoramic View of Minneapolis from East Side of Mississippi showing Milling District, St. Anthony's Falls and Business Section. *The importance of Minneapolis as an industrial center is largely due to water power development: Within the City limits, the Falls of St. Anthony makes available 57,000 horsepower, the Coon Creek Dam furnishes 16,000 horsepower, and the High Dam when completed will furnish an average of 15,000 horsepower; while Taylors Falls on the St. Croix River, a short distance from the City, furnishes 20,000 horsepower, making a total of 108,000 hydraulic*

Panoramic View of the Harbor of Duluth. *The harbor is naturally landlocked by a strip of land extending from the Minnesota to the Wisconsin shore, a distance of 7 miles. The area of the harbor is 19 square miles and the shore line 49 miles. There are 17 miles of dredged channels from 200 to 600 feet wide. In volume of tonnage the harbor of Duluth is second only to New York in the United States. Last year the total tonnage, mainly of ore, grain and coal, was 46,875,416 tons. Most of the boats enter the harbor through a dredged passage on the Minnesota side. This channel is*

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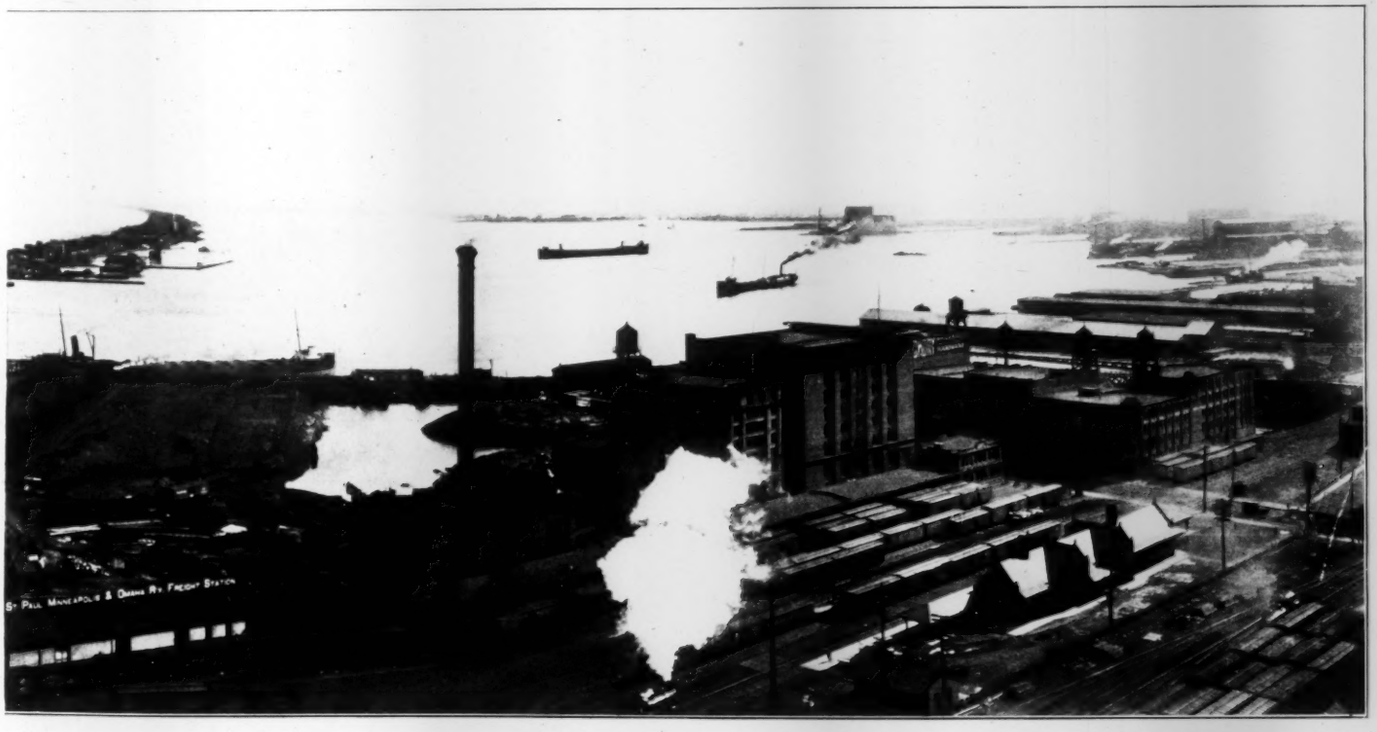
tric horsepower available for industrial purposes in Minneapolis. Near the Falls of St. Anthony within a space of eight square blocks is located the largest milling center in the world. Here are 22 of the 26 mills in operation in this City, among them being the Washburn-Crosby Mills, Pillsbury Flour Mills and the N. W. Consolidated Mills, the total output of whose daily product is in excess of 77,000 barrels of flour. In connection with the mills and in the same district are immense grain elevators handling thousands of bushels of grain daily.



Photograph by McKenzie, Duluth

spanned by the high aerial ferry bridge shown in the view. There are 29 coal unloading docks at the Head of the Lakes with a combined storage capacity of 10,089,000 tons, and a combined unloading capacity of 128,500 tons every ten hours. Almost every type of unloading equipment is represented in the harbor, and the larger docks are electrically equipped. The new ore docks and grain elevators are of steel and concrete construction. Ore and grain are loaded into steamers by gravity and a cargo of 10,000 tons of ore may be loaded in an hour to an hour and a half.